**REMARKS:**

OBJECTION TO THE DRAWINGS

The Office Action indicated objection to the drawings because the label of Y axis "T/To - 1" as shown in FIG. 2 and FIG. 3 is considered inconsistent with the description in, for example paragraph [0060]. Paragraph [0060] has been amended to clarify the similarity between Eqn. (2) and Eqn. (4) of the present invention.

OBJECTION TO THE SPECIFICATION

Objection to the specification was raised by the Office Action due to informalities. In response to the objection paragraphs [0035], [0036], [0046], [0047], [0049], [0058], [0060], [0072], [0082], [0083], [0097], [0110] and [0119] have been amended in the present application.

REMARKS REGARDING CLAIMS AMENDMENTS:

Claims 2, 4, 6, 8, 10, 12 and 28 have been cancelled to overcome potential objection by removal of substantial duplicate claims from the present application.

Cancellation of claims 2, 4, 6, 8, 10, and 12 overcomes objection due to questionable sequencing of dependent claims.

Claims 1 and 27 have been amended to overcome objection by providing method claims in accordance with 37 CFR 1.75(i), wherein each of a plurality of steps is separated by a line indentation.

Claims 1, 5, 18, and 27 have been amended to include antecedent basis as required to overcome rejection under 35 U.S.C. §112, 2nd paragraph.

Claims 1, 3, 5, 7, 9, 11 and 14 - 27 are pending in the present application.

**IN RESPONSE TO THE OFFICE ACTION:**

NOTIFICATION OF DUPLICATE CLAIMS

According to the Office Action, the present application includes several claims considered to be substantial duplicates of others claiming the present invention. Claims 2, 4, 6, 8, 10, 12 and 28 have been cancelled to remove the substantial duplicate claims, which action avoids the possibility of objection.

OBJECTION TO THE DRAWINGS

The Office Action indicated objection to the drawings because the label of Y axis "T/To - 1" as shown in FIG. 2 and FIG. 3 is considered inconsistent with the description in, for example paragraph [0060]. Paragraph [0060] has been amended to clarify the similarity between Equation (2) and Equation (4) of the present invention. As amended, Equation (4) is:

$$\Delta T/\Delta To\text{-}1 = 1/A$$

So that Equation (2) yields:

$$\Delta T = \Delta To(1 + 1/A)$$

Applicant acknowledges that as previously presented, the left hand side of equation (4) could have been interpreted to be $\Delta T/(\Delta To\text{-}1)$, which would lead to the perceived inconsistency of the Y axis. With the included clarifying amendments to paragraph [0060], it is believed to overcome objection to the drawing. Request is made for reconsideration and withdrawal of the objection.

OBJECTION TO THE SPECIFICATION

Objection to the disclosure was raised by the Office Action due to informalities. In response to the objection paragraphs [0035], [0036], [0046], [0047], [0049], [0058], [0060], [0072], [0082], [0083], [0097], [0110] and [0119] have been replaced in the present application.

Replacement of the affected paragraphs is believed to overcome objection to the specification. Request is made for reconsideration and withdrawal of the objection.

CLAIMS OBJECTIONS

The Office Action indicated objection to claims in the present application that appeared contrary to the requirement that, "[a] claim which depends from a dependent claim should not be separated by any claim which does not also depend from said dependent claim." Cancellation of claims 2, 4, 6, 8, 10, and 12 overcomes objection due to questionable sequencing of dependent claims. Applicant requests reconsideration and withdrawal of the objection.

Further objection to claims involved the assertion that each of the independent claims 1, 2, 27, and 28, setting forth a plurality of steps, should be separated by a line indentation. Claims 2 and 28 have been cancelled and claims 1 and 27 have been amended to overcome objection by providing method claims in accordance with 37 CFR 1.75(i), wherein each of a plurality of steps is separated by a line indentation. Request is made for reconsideration and withdrawal of the objection.

CLAIMS REJECTIONS - 35 USC §112

Claims 1 - 28 stand rejected under 35 U.S.C. §112, first paragraph as failing to comply with the enablement requirement. The Office Action asserted that the claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The basis for rejection was apparent omission of definition of a property "S" that was included in paragraphs [0093] and [0094] of the present application. Applicant disagrees that one of ordinary skill in the art would be unfamiliar with the term "S" due to the fact that it is well

known in the art to which the present invention pertains. Evidence to this effect is presented as follows:

Referring to Figure 5, the present application at paragraph [0027] includes the statement, "As described further below, the life of the brake is described by the number of surface-temperature cycles in the form of a power function (Figure 5) in an analogous manner to the S/N curve obtained in the case of fatigue." Paragraph [0028] further states, "With the aid of a part damage theory, the damage durability consumed by the braking cycles in relation to damage durability obtained from tests is then calculated." (emphasis added). Thereafter, paragraph [0092] includes the statement, "With the aid of a linear part damage theory (Palmgren-Miner). (emphasis added).

Attention is drawn to the fact that the present application refers to the life of a brake using a procedure analogous to the S/N curve used in the study of fatigue. Reference to the part damage theory of Palmgren-Miner also provides information familiar to one having ordinary skill in the art. Evidence of this resides in the fact that reference is made to the Palmgren-Miner theory in scientific treatises, exemplified by *Sun et al., Journal of Sound and* Vibration (2001) 245(5), p947- 952 and *Sarkarni et al,. 8th ASCE Specialty Conference on Probabilistic Mechanics and Structural Reliability, PMC2000-302* that includes, "The most simple approach to predicting fatigue life under any type of variable-amplitude loading is based on the linear [also known as the Palmgren-Miner (Miner, 1945)] damage accumulation rule. Simple analytical formulas, based on the Palmgren-Miner rule and random process theory, are available to calculate the expected fatigue life for stochastic loadings." It seems reasonable to expect that a theory existing for more than sixty years should be recognized as part of the bank of knowledge representing the state of the art. Based on that bank of knowledge, it is known that the quantity "S" refers to applied stress or stress amplitude, which in the case of the present invention is produced by pressure application against a rotary member.

For the reasons given, applicant submits that the identity of the term "S" is well known to one of ordinary skill in the art. Applicant therefore requests reconsideration and withdrawal of the rejection of claims 1 - 28 under 35 U.S.C. §112, first paragraph.

According to the Office Action, claims 1 - 28 are rejected under 35 U.S.C. §112, second paragraph. In particular, it is asserted that antecedent basis is missing for the recitation of "the nature of the rotary member" in claims 1, 2, 27 and 28. In claim 18 it is asserted that antecedent basis is missing for "the number of loading cycles." This asserted lack of antecedent basis caused the remaining dependent claims to appear indefinite.

Claims 2 and 28 have been cancelled and claims 1, 5, 18, and 27 have been amended to better provide antecedent basis in order to overcome the rejection under 35 U.S.C. §112, 2nd paragraph

Accordingly, request is made for reconsideration and withdrawal of the rejection of claims subject to rejection under 35 U.S.C. §112, 2nd paragraph.

CLAIMS REJECTIONS - 35 USC §102

Rejection of claims 1 - 19 and 22 - 28 under 35 U.S.C. §102(b) was included in the Office Action because of alleged anticipation of the present invention by Hara et al., U.S. Patent 5,723,779 issued March 3, 1998. The statement of rejection for claim 1 is included as follows for convenient reference and to provide evidence that Hara et al. fails to teach all the limitations of claim 1 as required of an anticipating reference:

> 13 - 1. Regarding claim 1, Hara et al. disclose a method for predicting life-affecting damage on a rotary member to be subjected to repeated loading during operation, said method comprising: measuring a number of operating parameters (for example control oil pressure, loading time, column 3, lines 38 - 56) and calculating a temperature increase during each loading based on said operating parameters ($k_3$ *Ec,* column 4, line 9); calculating a total temperature in a part of the rotary member for each loading by summation of a basic temperature of the rotary member before the loading concerned and said temperature increase (Temp, column 4, lines 6 - 9); utilizing the values for the total temperature as a measure of said damage and wherein that part of the rotary member for which the total temperature is calculated defines a surface acted on when the rotary member is loaded (facing temperatures, column 4, lines 11 - 23) and two sets of predetermined functions (K, L; M, N), each

> comprising at least one function, as used for temperature-increase calculation (formulas, column 3, line 62 through column 4, line 4); and utilizing the sets used for temperature-increase calculation and making a selection depending on at least the nature of the rotary member (formulas, column 3, line 62 through column 4, line 9).(emphasis added).

In response to the Office Action, applicants have considered the Examiner's selection of Hara et al., but respectfully disagree that it meets the teaching requirements of an anticipating reference under 35 U.S.C. §102. For there to be anticipation under 35 U.S.C. § 102, "each and every element" of the claimed invention must be found either expressly or inherently described in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) and references cited therein. See also *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565, 1571, 230 U.S.P.Q. 81, 84 (Fed. Cir. 1986) ("absence from the reference of any claimed element negates anticipation."); *In re Schreiber,* 128 F.3d 1473, 1477, 44 U.S.P.Q.2d 1429, 1431 (Fed. Cir. 1997).

A drawback of using substantially the text of applicant's claim when constructing a statement of rejection is the tendency for the Examiner to emphasize those parts of the claim that may be found in the reference while ignoring those parts of the claim about which the reference is silent. It is apparent that Hara et al. describes aspects of claim 1 such as "operating parameters" and "temperature increase," for example. However, it is equally clear that Hara et al. lacks teaching of the nature and property changes of the rotary member since no portion of the reference was cited as providing teachings of these limitations.

The following table provides evidence that Hara et al. is deficient as an anticipating reference under 35 U.S.C. §102 because at least three limitations of claim 1 according to the present invention that are not found in the reference.

| Claim Requirements of the Present Invention | Hara et al. U.S. 5,723,779 |
|---|---|
| Claim 1 recites "… calculating a total temperature in a part of the rotary member … by summation of a basic temperature of the rotary member" | Hara et al. teaches the measurement of the temperature of a "working fluid" (see e.g. Col. 2, lines 5 - 7 and Col. 3, lines 44 - 46). There is no evidence of direct measurement of temperature in any part of the "wet multiple friction clutch" **11a**. |
| Claim 1 recites "… by summation of a basic temperature of the rotary member before the loading concerned…" | The reference does not teach direct measurement of the actual temperature of the clutch of Hara et al. Consequently, the reference is silent regarding the clutch's temperature before loading. |
| Claim 1 further recites "…making a selection depending on at least ~~the nature~~ a material property of the rotary member." | Hara et al. fails to teach the nature of the friction clutch such as material constituents or properties associated with the clutch structure. |

The following discussion provides further detail of comments, included in the previous table, to show that Hara et al. does not teach all the limitations of claim 1 of the present invention, as required to sustain rejection of claims under 35 U.S.C. §102. It appears that the rejection relies upon temperature determination, but ignores the difference between Hara et al. and claim 1 of the present invention. The difference exists in the material or object for which the temperature is measured. Hara et al. measures the temperature of the working fluid that drives the clutch. As claimed, the present invention makes direct measurement of the temperature of the rotary member (the clutch in the case of Hara et al.) The statement at Col. 4, lines 5 - 9, i.e. "A temperature Temp of a facing of the multiple friction clutch **11a** is obtained by the following formula:" appears to be ambiguous. While suggesting that the temperature is a "clutch facing temperature," it is clear that the "Temp" is a function of the oil temperature $T_{oil}$ and the loaded energy Ec that is a function of control oil pressure Pc and differential revolution ΔN. Hara et al. does not teach that any of $T_{oil}$ or Ec or Pc or ΔN are measured with respect to the clutch itself. Applicant submits that

ambiguity of the term "clutch facing temperature" resides in optional interpretations of the temperature representing that of the clutch face or that of the oil presumably further modified by contribution of the loaded energy Ec. Regardless of the interpretation, there is nothing in Hara et al. suggesting direct measurement of the temperature of the rotary member as required by claim 1 of the present invention. If Hara et al. does not measure the temperature of the rotary member, the reference cannot teach the "basic temperature of the rotary member before loading ..." as recited in claim 1 of the present invention.

Paragraph [0012] according to the present invention states as follows:

> [0012] Characteristics of the rotary member are determined, at least in part, based on the member's internal structure, external dimensions, the material of its construction, the material properties and the thickness of the rotary member. According to the embodiment described below, the function used for temperature-increase calculation is selected depending not only on the nature of the rotary member, but also on the duration in time of the loading.

International Application No. PCT/SE02/00879, incorporated into the present application by reference and from which the present application claims priority, includes the following paragraph corresponding to the preceding paragraph [0012]:

> The nature of the rotary member means its internal structure and external dimensions, in other words, for example, the material selection, the material properties and the thickness of the rotary member. According to the embodiment described below, the function which is to be used for temperature-increase calculation is selected depending not only on the nature of the rotary member but also on the duration in time of the loading.

The cited reference portions from the International application and the present application provide evidence that the characteristics or "nature" of the rotary member refer to its internal structure in terms of material selection, material properties and physical dimensions. Claim 1 has been amended to replace recitation of the term "nature" by -- at least a material property --. Hara et al. neither describes the clutch in terms of material selection or properties nor the external dimensions of the rotary member. The reference thereby fails to teach all of the limitations of claim 1 of the present invention.

In view of the previous discussion, applicant requests reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. §102(b).

Claims 2, 4, 6, 8, 10, 12 and 28 have been cancelled leaving claims 1, 3, 5, 7, 9, 11, 13 - 19 and 22 - 27 subject to rejection under 35 U.S.C. §102(b). Since claims 1, 3, 5, 7, 9, 11, 13 - 19 and 22 - 26 have dependency from claim 1 and evidence shows that claim 1 is allowable, applicant submits that claims 1, 3, 5, 7, 9, 11, 13 - 19 and 22 - 26 should likewise be allowed.

In view of the above, a request is made for reconsideration and withdrawal of the rejection of claims 1, 3, 5, 7, 9, 11, 13 - 19 and 22 - 26 under 35 U.S.C. §102(b).

Independent claim 27 also recites limitations not found in Hara et al. including, "a total temperature in a part of the rotary member" and "basic temperature of the rotary member before the loading" and "at least ~~the nature~~ a material property of the rotary member." Omission of these limitations from the teachings of Hara et al. provides evidence that the reference fails to meet the requirements for anticipation of the present invention under 35 U.S.C. §102(b). Therefore, applicant believes that claim 27 is an allowable claim.

Request is respectfully made for reconsideration of claim 27, as amended, and withdrawal of rejection under 35 U.S.C. §102(b).

The Office Action does not appear to contain evidence of examination of claims 20 and 21 of the present application except with regard to the requirements of 35 U.S.C. §112. Acceptable amendment overcoming rejection under 35 U.S.C. §112, 1st and 2nd paragraphs should place claims 20 and 21 in condition for allowance.

CONCLUSION

Of the prior art made of record and not relied upon, none of the references appear to be pertinent to the present invention as currently claimed.

Applicant has made an earnest attempt to respond to all the points included in the Office Action and, in view of the above, submits that the application is in condition for allowance. Consequently, request is respectfully made for reconsideration of the application and notification of allowance of claims 1, 3, 5, 7, 9, 11 and 14 - 27 in the next paper from the Office.

The undersigned representative requests any extension of time that may be deemed necessary to further the prosecution of this application.

The undersigned representative authorizes the Commissioner to charge any additional fees under 37 C.F.R. 1.16 or 1.17 that may be required, or credit any overpayment, to Deposit Account No. 14-1437, referencing Attorney Docket No.: 7589.0150PCUS00.

In order to facilitate the resolution of any issues or questions presented by this paper, the Examiner may directly contact the undersigned by phone to further the discussion.

Respectfully submitted,

Tracy W. Druce, Esq.
Reg. No. 35,493

Novak, Druce & Quigg, LLP
1000 Louisiana, Suite 5300
Houston, Texas 77002
(713) 571-3400
(713) 456-2836 (fax)
tracy.druce@novakdruce.com